OCTOBER 10, 1983

CHEMICAL & ENGINEERING

NEWS

Chemical capacity use rising
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SYNFUELS

After 10 years, no producing industry Page 11

Cover: Airco oxygen unit goes up at Cool Water Coal Gasification Program at Daggett, Calif. Photo by Bill Mitchell

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CHEMICAL & ENGINEERING
NEWS
OCTOBER 10, 1983

News of the Week

■ **Both OSHA and EPA restrict use of and exposure to ethylene dibromide.** **Page 4**

■ **El Paso Products Co. seems to be on the verge of selling its chemical segment.** **Page 5**

■ **CAS and West German database supplier will connect on-line computer information services in 1984.** **Page 5**

■ **Two new reports published on yellow rain.** **Page 5**

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World oil prices will fall in the near future but will begin to rise again during the mid-1980s, DOE projects. **Page 14**

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Government

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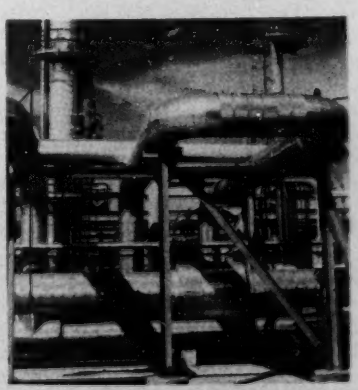


News Focus

Organics are the leaders in boosting chemical plant capacity use as production grows and capacity drops. **Page 6**

Chemical Plant Capacity Use Accelerates as Organics Lead Way

Revived U.S. economy pushes plant use rate for basic chemicals to 68%, highest in two years, and hikes use rates for plastics to 79%, for synthetic fibers to 85%

William F. Fallwell, C&EN Washington
Bruce F. Greek, C&EN Houston

The chemical industry has eased into a confident upswing following the final shocks of an extraordinarily severe business downturn in the past four years. Recovery has proceeded far faster than expected, even though it has not yet touched all parts of the industry. As a result, the industry may soon have to consider physical expansion in some areas.

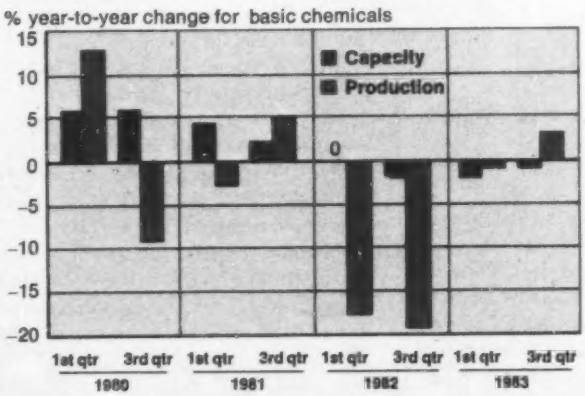
Aside from profits, the key measure in gauging the industry's recovery and in planning the years just ahead is plant operating levels. So far in the 1980s, capacity use has been so low that the industry's main asset moves have been to clean out antiquated plants and drastically upgrade efficiency in surviving units. As a result, most chemical plants can make money at lower use levels than in the past.

So the current rise in plant use rates is doubly meaningful. Although the recovery pace is not the same in all parts of the industry, in the most favored major product areas, organics and downstream polymers, use rates have jumped 10 percentage points or more in just half a year. Inorganics, as usual, lag the pack.

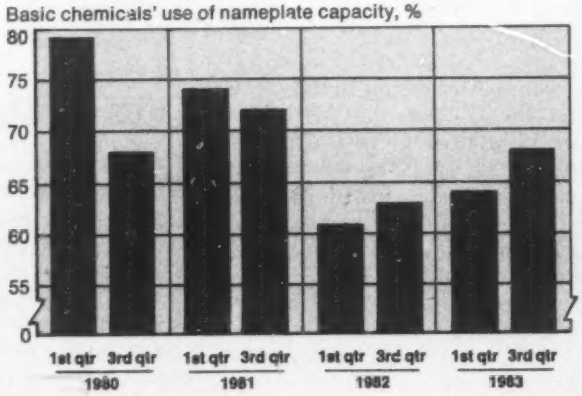
Overall, C&EN's semiannual survey of capacity use in 32 basic chemicals and 11 polymers finds that, from early 1983 to midyear:

- Polymers led the way, with production rates rising to 82% of nameplate capacity from 71%; the low point was 66% in early 1982. Within this group, capacity use rose to 79% from 70% for thermoplastics and to 85% from 71% for synthetic fibers.
- Upstream basic chemicals, trailing polymers as usual, accelerated a slow earlier upturn, with capacity use moving to 68% from 64%; the low point was an unheard-of 61%, also in first-quarter 1982.

Chemical production finally is growing and plant capacity continues to slip...



...which results in a boost for formerly very low rates of capacity use



Sources: Industry and government data, C&EN estimates for 32 leading basic chemicals

• Plant use rates based on effective capacity (5 to 15% lower than nameplate because of various inefficiencies) shot up to 76% in basic chemicals and 89% in polymers.

• Behind these capacity use data, component production figures are on the way up for most products—2% in basic chemicals and a rousing 15% in polymers.

C&EN's figures underplay the industry's tight capacity management, since they don't delete extensive capacity temporarily shut down until the business recovery reaches higher levels. For example, 15% of ethylene and coproduct capacity could still be down, 25% for ammonia, and lesser percentages for urea, chlorine/caustic, cyclohexane, ethanol, phosphoric acid, phosphorus, sulfur, polyvinyl chloride, and polystyrene.

Effective plant use in basic chemicals pushes up to 76%

Billions of lb per year unless otherwise noted[a]	Third-quarter 1983			First-quarter 1983			Third-quarter 1982		
	Capacity (nameplate)	Capacity use Nameplate	Effective	Capacity (nameplate)	Capacity use Nameplate	Effective	Capacity (nameplate)	Capacity use Nameplate	Effective
Petrochemicals—olefins and aromatics[b]									
Ethylene	38.4	74%	82%	39.0	67%	74%	39.0	61%	68%
Propylene (chemical and polymer)	23.0	61	68	23.0	49	54	23.0	56	62
Butadiene[c]	4.5	58	64	4.5	37	41	4.4	40	44
Benzene (bg)	2.3	60	67	2.3	43	48	2.4	48	53
***p*-Xylene**	4.9	93	98	4.9	68	72	4.9	60	63
Petrochemicals—C_1 derivatives									
Ammonia (mt)[b]	18.7	64	67	18.7	71	75	19.8	82	87
Urea (mt)[b]	7.8	59	66	7.8	73	81	7.8	72	80
Methanol (bg)	1.8	63	70	1.7	56	62	1.6	76	84
Formaldehyde (37% solution)	9.2	56	59	9.2	55	58	8.9	47	49
Chlor-alkalies									
Chlorine (mt)[b]	14.5	70	74	14.4	67	71	14.6	64	67
Caustic soda (mt)[b]	15.5	66	70	15.4	66	69	15.6	61	64
Soda ash (mt)	10.7	81	85	10.7	74	78	10.9	73	77
Acids									
Sulfuric (mt)	57.5	52	55	57.5	59	62	59.6	49	52
Phosphoric (P_2O_5, mt)[b,d]	12.5	66	69	12.5	71	75	12.6	64	67
Industrial gases									
Oxygen / **Nitrogen** (total, liquid, ttd)	40.0	64	78	37.0	64	78	36.6	65	82
Carbon dioxide (ttd)[e]	19.6	64	70	18.9	61	68	18.4	67	75
Mineral-based inorganics									
Sulfur (total, mmt)[b]	16.0	50	—	15.5	48	—	15.8	53	—
Potash (mt)	2.2	50	—	2.2	86	—	2.7	74	—
Phosphorus (mt)[b]	0.55	67	71	0.55	65	69	0.55	68	72
Plastics intermediates									
Styrene	8.1	77	91	8.2	64	75	8.7	69	81
Vinyl chloride	9.3	79	87	10.1	65	72	10.0	68	76
Toluene diisocyanate	0.70	83	92	0.70	94	104	0.70	76	85
Fiber intermediates									
DMT-PTA[f]	7.6	80	94	7.3	64	75	7.3	56	66
Ethylene oxide	7.3	75	84	7.3	76	84	6.8	67	74
Cyclohexane[b]	3.4	52	55	3.4	31	33	3.1	37	39
Adhesives, coatings intermediates									
Phenol	3.3	83	92	3.6	64	71	3.6	61	68
Vinyl acetate	2.4	83	88	2.4	90	95	2.3	91	96
Pigments									
Carbon black	3.3	73	81	3.3	63	70	3.4	62	69
Titanium dioxide (mt)	0.91	86	100	1.0	60	71	1.0	61	72
Solvents									
Acetone	3.0	67	74	3.3	57	63	3.3	53	59
Ethanol (mg)[b]	240	59	62	240	72	76	240	75	79
Methylene chloride	0.83	71	79	0.83	59	66	0.83	63	70
AVERAGE		**68%**	**76%**		**64%**	**70%**		**63%**	**69%**

a bg = billions of gal, mt = millions of tons, tt = thousands of tons, ttd = thousands of tons per day, mmt = millions of metric tons, mg = millions of gal. b Substantial capacity currently shut down. c Total extraction capacity, which runs about 25% more than basic production capacity. d Includes both wet-process and furnace-process capacity. e Excludes oilfield operations. f Dimethyl terephthalate and DMT equivalents of purified terephthalic acid. **Sources:** Industry and government sources, C&EN estimates

PPG Industries modernizes Natrium, W.Va., chlorine-caustic soda plant to make operation more cost-effective

However, C&EN percentages are undoubtedly closer to reality than six months ago, since many plants have been brought back on stream to feed renewed demand. Also, the recovery pace is widely thought to be moderating from its red-hot level of spring and early summer, so current capacity use might not be much higher than at midyear.

Leading chemical companies commenting on capacity use say that overall averages have hit 70%—between C&EN's averages for basic chemicals and polymers. For example, Du Pont's chemicals hit this point in early spring, and Monsanto is there now.

At one time, such use levels would have meant little or no profit, but not any more. As Monsanto president Richard J. Mahoney told C&EN last month (C&EN, Sept. 26, page 10), "We're running somewhere in the 70% occupancy rate now and we believe we can break even at about 60%. Overall, we used to think the break-even point was somewhere about 75%, and here we are making good money at 70%. I believe there's enough steam in the economy to move those occupancies well up into the 80% levels."

A quick look at C&EN's capacity use score sheets shows the main product areas contributing to these higher overall use averages—and also those still acting as a drag. Plastics and fibers were already on the move in the previous survey (C&EN, May 23, page 7), and they have picked up speed since then. Particularly influential are the two polyethylenes, polypropylene, polyester, and nylon, all of which have moved to more than 80% capacity use. In the best case, a booming carpet market has pushed nylon staple output close to capacity limits.

Both plastics and fibers are enjoying double-digit annual growth in the first year of recovery. Over the past 12 months, production of both the five leading thermoplastics and six main fiber types is up 21%. Growth has been 13% in plastics and 15% in fibers in just the past six months.

In basic chemicals, the good news is that first-stage petrochemicals—the ones made directly from oil or natural gas fractions—have begun to join the recovery. Their plant use rates had sunk so low that they are still below the average for basic chemicals, but they are on their way. Basic olefins and aromatics covered in the

Plant use tops 80% in the leading commercial polymers

Billions of lb per year	Third-quarter 1983 Capacity (nameplate)	Third-quarter 1983 Capacity use Nameplate	Third-quarter 1983 Capacity use Effective	First-quarter 1983 Capacity (nameplate)	First-quarter 1983 Capacity use Nameplate	First-quarter 1983 Capacity use Effective	Third-quarter 1982 Capacity (nameplate)	Third-quarter 1982 Capacity use Nameplate	Third-quarter 1982 Capacity use Effective
PLASTICS									
Polyethylene, low density	10.1	81%	86%	10.1	74%	79%	9.3	76%	81%
Polyvinyl chloride[a]	8.9	71	83	8.9	55	64	8.4	59	69
Polyethylene, high density[b]	6.3	94	99	6.3	85	89	6.1	82	86
Polypropylene	5.1	86	96	5.1	83	92	5.1	61	68
Polystyrene[a]	5.3	64	75	5.3	55	65	5.3	60	71
AVERAGE		**79%**	**88%**		**70%**	**78%**		**68%**	**75%**
SYNTHETIC FIBERS									
Filament yarn									
Polyester	1.6	88	93	1.6	83	88	1.6	76	81
Nylon	1.9	84	90	1.9	64	68	2.0	64	68
Olefin	1.1	71	75	1.0	48	51	0.99	60	64
Staple									
Polyester	2.7	89	95	2.7	75	80	2.8	62	66
Nylon	0.99	96	102	0.98	81	86	0.99	76	81
Acrylic	0.83	83	88	0.83	77	82	0.84	82	87
AVERAGE		**85%**	**91%**		**71%**	**76%**		**70%**	**75%**
OVERALL AVERAGE		**82%**	**89%**		**71%**	**77%**		**69%**	**75%**

a Between 5 and 10% of this capacity shut down. b Excludes 500 million lb new capacity starting up. **Sources:** Industry sources, Society of the Plastics Industry, Textile Economics Bureau, C&EN estimates

C&EN capacity use indicator: the ground rules

Capacity use at chemical plants is difficult to measure and requires certain assumptions. These bring some order to the maze of variables affecting this critical indicator of the industry's health.

With the help of industry and government sources, C&EN measures capacity use as a percentage of both nameplate and effective maximums. Nameplate capacity is the official design capacity of plants. Effective capacity is the practical maximum after reductions for unplanned maintenance, corrosion problems, changes in product mix, and other influences. Although engineering companies and industry statistics groups try to make nameplate capacity data as real as possible, practical problems almost always reduce effective maximums to 85 to 95% of the official totals. For short periods, plants can run more than 100% of effective top capacity, but such a rate doesn't last more than a few months.

Capacity use is given over as much of a calendar quarter as production data permit, with no seasonal adjustment. The figures are for plants actually operable. At present, some products such as ethylene, ethanol, chlorine, polystyrene, ammonia, and urea have plants temporarily shut down because of weak markets. These plants still are included in capacity totals. The totals exclude new plants just starting up and old plants out of operation for long periods because of accidents. As much as possible, capacity figures stay current with expansions.

Capacity data don't take into account other temporary fluctuations for fuel and electric power interruptions, equipment failure, and feedstock scarcity or substitution. The feedstock variables, for example, have been important in the past few years in ethylene production, altering maximum output for several coproducts such as propylene, butadiene, and benzene.

Products in C&EN's capacity use survey are the same as those in the Key Chemicals and Key Polymers series. These are the core products of the industry, the building blocks leading to downstream production of thousands of more specialized products.

C&EN survey—ethylene, propylene, butadiene, benzene, and *p*-xylene—have reached 69% of nameplate capacity, up from 53% in early 1983.

The natural gas-derived C_1 derivatives—ammonia, urea, methanol, and formaldehyde—haven't moved as much in plant use, rising only to 66% from 64%. The root of the trouble is the principal market still holding down the whole chemical industry—fertilizer. Fertilizer is finishing a wretched year but could perform much better in 1984 as farm income starts to rebound. So ammonia and urea could get some relief. For methanol and formaldehyde, the refreshed housing market has been a boost, but formaldehyde has taken a beating in some markets because of suspected safety problems.

Fertilizer also has had a hand in delaying recovery for four leading inorganics. Sulfuric and phosphoric acids depend so heavily on farm markets that their capacity use, alone among major categories, has fallen in the past half-year—to a combined 59% in the third quarter from 65% in early 1983. For the same reason, potash capacity use has tumbled to barely 50% from 86%. And sulfur capacity use has stayed very low, about 50%.

The two other major inorganic groups haven't done much better. Chlor-alkali analysts are happy that chlorine plant use has regained 70%, the best since 1981, but that's historically very low for chlorine and isn't up much from 67% in the first quarter. Also languishing are the major industrial gases—oxygen, nitrogen, and carbon dioxide—whose overbuilt capacities are operating at 64%.

The picture brightens in three classes of organic intermediates. Major plastics intermediates—styrene, vinyl chloride, and toluene diisocyanate—have felt the strength downstream and are all close to 80% in capacity use, up from an average of 74% six months ago. Styrene and TDI have moved over 90% in effective capacity use, and their supplies are considered to be tight.

Not quite so strong, the leading fiber intermediates—dimethyl terephthalate/terephthalic acid, ethylene oxide, and cyclohexane—still have climbed to 69% capacity use from 57% early in the year. Biggest percentage gainer of these is cyclohexane, whose plant use zoomed to 52% from 31% in the latest six months to supply booming nylon. But DMT/PTA wasn't far behind, with plant use rising to 80% from 64%. Ethylene oxide actually slipped to 75% from 76% because of a sluggish antifreeze (nonfiber) market.

In the adhesives and coatings intermediates, vinyl acetate moved over 80% plant use and phenol staged a dramatic upturn, rising to 83% from 64% early in the year. Although the rise is genuine, based on the big gain in phenol's housing market, it is levered by a cut in estimated plant capacity. A major capacity shakeup is due to phenol this fall as Monsanto shuts down 500 million lb per year at Alvin, Tex., and Allied restarts 500 million lb of capacity at Frankford, Pa. The capacity total of 3.3 billion lb won't change.

A companion shift will occur in coproduct acetone capacity at Monsanto and Allied, involving 300 million lb per year on both sides. Since Shell and Exxon have closed isopropyl alcohol-based acetone units, C&EN's capacity estimate is now 3.0 billion lb, down from 3.3 billion in early 1983. Capacity use in the solvent has moved up to 67% from 57% in the past six months. In other solvents, methylene chloride has joined the recovery with a plant use increase to 71% from 59%. But sagging synthetic ethanol, beset with competition from fermentation ethanol, has slumped to 59% from 72%.

The remaining major product area, pigments, has benefited nicely from the business recovery. As expected, titanium dioxide has moved toward new prosperity, with plant use jumping to 86% from 60% last winter. One statistical aid was a 9% drop in estimated capacity owing to a plant closing. Carbon black hasn't reached this stage of recovery, but capacity use has climbed to 73% capacity from 63%. □

Oleochemicals Fashion Long-Term Optimism from Near-Term Gloom

Producers believe that improved crop yields and eventual higher oil prices will make their products more competitively priced

Patricia L. Layman, C&EN London

When an industry is facing such problems as steeply rising prices of its raw materials while the prices of competing materials slump, and intensifying competition on a worldwide basis is shaking up the industry's basic structure, it might be excused for some gloom. But even with problems such as those facing the oleochemicals industry, it remains surprisingly optimistic.

Oleochemicals marketers, in fact, believe that in the long run, improved crop yields and plantings will help bring down prices that are now off on a cyclical spurt. They believe that, assuming the oil glut will not be permanent and so will someday end, there will be a concomitant end to the present low prices of major petrochemical feedstocks. Moreover, as specialty oils from now-exotic oilseed crops become more important for specific end-use applications, there is a possibility that growers or crushers can contract directly with customers, getting away from the volatile world of the commodities market.

And perhaps more important as a reason for optimism is that the industry is so diverse, with few end uses having a significantly high share of the total market. Enough of those end uses individually have healthy growth prospects that the overall industry stands to benefit once the economy starts moving again.

To some extent, the very diversity of the industry has been a problem for it. Some in the industry, for example, speak somewhat defensively of "the invisible industry." The American Oil Chemists' Society used that expression, in fact, when it set up its first world conference on oleochemicals in Montreux, Switzerland, late last month. Some 90% of the world's annual production of roughly 60 million tons of animal and vegetable fats and oils is consumed in edible products. That dwarfs the remainder, which goes into oleochemicals, for eventual incorporation into consumer products such as cosmetics and detergents, or industrial formulations for mining, plastics processing, printing inks, transportation, and a host of other fields.

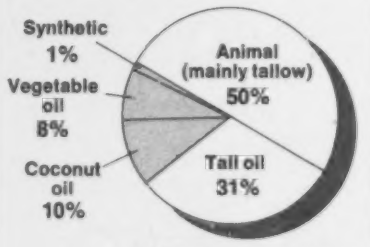
Probably the most striking feature of the oleochemicals industry today is its often-fierce competition with the petrochemicals industry. Actually, at times, there is little true competition. For fatty acids, for example, petrochemicals make up only 1.2% of the total raw-material sources. And fatty acids are by far the largest segment of the oleochemicals industry, accounting for nearly 59% of the total business.

However, with other product areas, petrochemicals make up a far more significant share of the market. In the production of alcohols for detergents, for example, petrochemically based alcohol probably accounts for nearly 85% of the total; as late as the early 1960s, detergent alcohols were almost exclusively derived from natural fats and oils.

Few other areas show such decidedly lopsided balances. But the two raw materials industries nevertheless abide in a somewhat nervous but courteous coexistence, as customers swing back and forth in response to raw material price fluctuations.

At present, pricing is being influenced most heavily on the petro-

Tallow, tall oil yield most U.S. fatty acids



1982 fatty acid output = 1.3 billion lb

Source: Humko Chemical

U.S. oleochemicals market is dominated by fatty acids

Millions of lb	1982	1977	1968	1982 sales ($ millions)
Fatty acids	1300	1279	916	$ 455
Natural fatty alcohols	150	140	120	97
Natural crude glycerine	125	178	213	79
Surfactant esters	250	226	164	228
Fatty amines, amine oxides	307	261	155	255
Fatty alkanolamides	60	81	57	46
Other fatty amines	23	23	15	24
TOTAL	2215	2188	1940	$1184

Sources: Humko Chemical, C. H. Kline & Co., U.S. International Trade Commission

Competition is changing the fatty-acids roster

Acme Hardesty Co.[a]	A. Gross & Co.[c]
Arizona Chemical	Humko Chemical[c]
Armak Co.[b,c]	Hercules
Ashland Chemical Co.[c]	Pacific Vegetable Oil Co.[a]
Capitol City	Petrochemicals[c]
Crosby Chemicals[c]	Procter & Gamble
Darling & Co.	Reichhold Chemicals
Emery Industries[c]	Sylvachem Corp.
General Mills[b,c]	Union Camp Corp.
Glyco Chemicals	Westvaco Corp.

Note: U.S. producers, 1974–83. a No longer a producer. b No longer in merchant fatty acid business. c Changed ownership 1974–83. Source: Humko Chemical

chemicals side by the current abundance of oil that is forcing crude oil prices down, helping to keep petrochemical prices down. It hasn't always been that way. Following the Arab oil embargoes, for example, the price of ethylene, among others, began a steady rise, and at one point became more expensive than tallow, soybean oil, and coconut oil.

At that time, soy and coconut oils were both showing price decreases, reaching decade lows in 1982. Since then, however, prices have started up with news of crop failures in the U.S.S.R., and drought-damaged crops in many other parts of the world. Some oleochemicals producers, for example, feel that official estimates for soybean crops in the U.S. of 1.55 billion bushels is unrealistically optimistic. More likely, they predict, are yields of only 1.3 billion bushels or even 1.2 billion bushels.

Such a dramatic decrease in soybean yields will mean stress on other oilseed crops. Most of the pressure will be for edible uses; the "invisible industry" of oleochemicals unfortunately doesn't pack that much clout in comparison. It will also mean higher grain prices for animal feed—so more animals will be slaughtered. For the short term, that will be good news for tallow purchasers, but longer term, the prices will go up as there are fewer animals to keep the tallow supply constant.

Given their historical vulnerability to natural disasters, weather problems, crop failures, and so on, suppliers of fats and oils are working to tackle the situation in several ways. One simple way: Increase the crop plantings. Oleochemicals marketers are fond of pointing out that their feedstocks are renewable resources, and indeed, the Far East, in particular, is renewing resources at a smart clip. In Malaysia, palm oil already has outstripped natural rubber as a key export. Exports of palm oil are predicted to hit 3 million metric tons this year, compared with 2.8 million in 1982. (Natural rubber exports are expected to be 1.51 million metric tons this year.) An additional 500,000 metric tons of palm oil were consumed within the country. Total Malaysian palm oil production is expected to climb to 4.3 million metric tons in 1985, and 6.5 million by 1990.

Meanwhile, Canadian crushers are boosting their production of rapeseed oil. World production of rapeseed oil in 1981 was 3.8 million metric tons; that is expected to climb to 7 million by 1990, by far the fastest-growing oil. By contrast, world production of soy oil, 12.2 million metric tons in 1981, is expected to hit 15.9 million, and output of tallow is expected to grow from 6 million to 7.2 million metric tons by 1990. Coconut oil production is forecast to grow from 1.5 million metric tons in 1981 to 3 million metric tons by 1990.

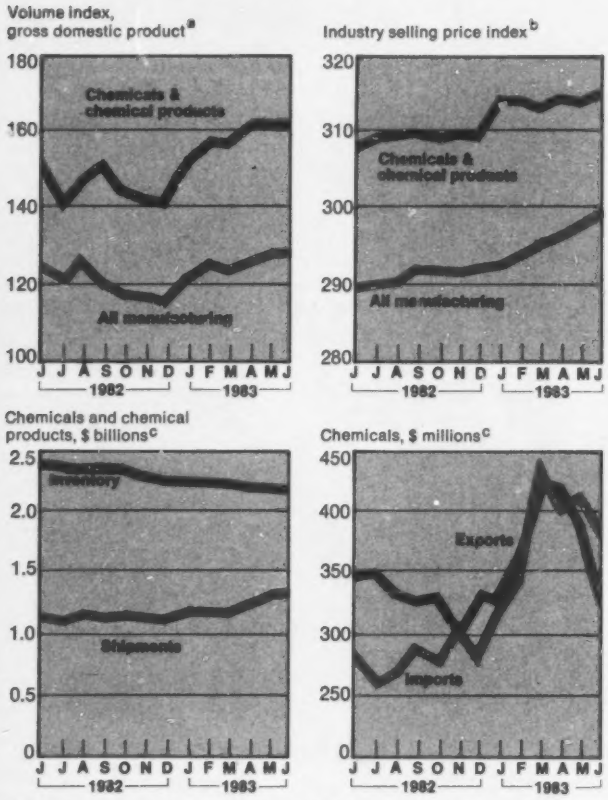
To some extent, the naturally derived fats and oils are interchangeable. But each has some characteristics that make it more suitable for some uses than for others. For example, Henkel marketers noted at the Montreux oleochemicals conference that rapeseed oil has a high proportion of long-chain components that make it especially attractive for conversion into fatty alcohols, for example, for further modification into oilfield chemicals and synthetic lubricants. Similarly, palm-oil characteristics can lead it into serious competition for markets in the oleochemicals market, predicts Colin A. Houston, a consultant in Mamaroneck, N.Y., who is embarking on a study of the oil.

One of the key determinants in what happens to the fats and oils industry, many marketers believe, will be the impact of new technology on both processing and crop yields. For example, it could be something as basic as developing clays that can quarter the time for hydrogenation of the oils and fats, or the exotic promise of enzyme splitting and genetic manipulation of oil-producing crops. Houston, for instance, predicts that "future gene manipulation techniques will provide the tools to alter the chemical structure of the oils produced from palm."

According to M. K. Schwitzer, an oleochemicals consultant in London, already "a beginning has been made to replace existing chemical processes by biotechnological techniques such as algal oil and glyceral production, enzymic fat splitting, and the preparation of cocoa butter replacers."

And agriculture researchers are working hard to give the oleochemicals industry even more raw materials to play with. The U.S. Department of Agriculture, for example, has a major research program to identify new oilseed crops, according to Lambertus H. Princen, assistant director of USDA's northern regional research center in Peoria, Ill. Not only are the crops potential sources of oil, "we've found all sorts of unique acids in seed oils," Princen says, with various epoxy and keto groups, mixtures of chain lengths that range from eight to 12 carbons to others of 20 to 28 carbons. Crambe is a potential winner, USDA feels, as is cuphea, another oilseed crop. And raising high hopes in a startling wide swath of the world, from the U.S. Midwest to New Zealand, is the orange roughy, a fish recently discovered in New Zealand waters that is being touted both for its flesh, as a piscatorial delicacy, and as a source of oil. □

Canada's chemical industry is bouncing back



a Seasonally adjusted, 1971 = 100. b 1971 = 100. c Canadian dollars.
Source: Statistics Canada

Chemical output: still a few weak spots

Production, thousands of metric tons	1982	Seven months 1982	Seven months 1983	% change 1982–83
ORGANICS				
Ethylene	1013	545	678	24.5%
Propylene	618	391	415	6.2
Benzene	504	300	328	9.3
Toluene	470	259	239	−7.7
Xylene	396	243	237	−2.8
PLASTICS				
Polyethylene, total	571	336	338	1.0
Polyvinyl chloride	194	118	140	18.7
INORGANICS				
Hydrochloric acid	135	77	93	19.9
Nitric acid	977	596	482	−19.1
Phosphoric acid[a]	503	359	354	−1.4
Sulfuric acid	3131	2024	1971	−2.6
Ammonia, anhydrous	2509	1502	1616	7.6
Ammonium phosphate	888	655	719	9.9
Chlorine	1233	735	771	5.0
Sodium hydroxide	1367	816	856	5.1

a 100% P_2O_5. **Source:** Statistics Canada

The Canadian economy, which followed that of the U.S. into recession, is following it back into recovery. Business conditions in Canada may not be all that everyone would like, but they are immeasurably better than they were a year ago. What's more, this recovery appears to be sustainable and likely to continue throughout the rest of 1983 and into next year. And, after last year's economic fiasco, this recovery is unashamedly welcome.

For Canadian chemical companies, the recovery is particularly welcome. Last year, the petrochemical sector lost $129 million (Canadian), its worst loss on record and a dramatic reversal from the $198 million net profit chalked up in 1981. Inorganic chemical companies retreated to profit levels of 1975; those in the organic and specialties chemicals segment suffered drastic drops in profits.

This year, Canada's chemical industry is riding the country's economic resurgence back to profitability. But the recovery has not permeated all chemical industry segments equally. Not yet, anyway.

At midyear, for instance, output of medicinals and pharmaceuticals had not yet bounced back to year-ago levels. Some of the heavy inorganic acids still are struggling. Aromatics output still is slow.

For too many products, plant operating rates are not yet up to comfortable levels. Selling prices are up, but not as much as some producers would like to see. Output of many major commodity chemicals, although running ahead of last year's anemic pace, have not yet reached 1981 levels.

However, Canadian chemical companies no doubt will benefit from several encouraging developments. The auto and construction industries are perking up. And most chemical companies, forced by last year's recession to trim excess fat, are in good shape to profit from the economic upturn.

In general, the Canadian chemical industry is outpacing the all-manufacturing average in the race toward recovery. Output is running about 8% ahead of last year's pace, with some specialty areas such as paints and soaps showing particular strength.

In Canada's all-important petrochemical industry, ethylene output is improving dramatically. Production is running about 25% above last year's levels, helped by a 19% boost in production of polyvinyl chloride. Polyethylene, however, still is sluggish.

Exports, also critical for Canada's chemical industry, are not faring so well as companies would like. Through the first half of the year, chemical exports were up only 4%, whereas imports have increased 17%. These imports, of course, reflect Canada's surging economy, but exports still must contend with foreign economies that have not recovered fully from the recession.

Meanwhile, Canadian chemical leaders are happy with the healthier business climate they already are enjoying. Canadian economists see a 3% improvement in gross national product this year and an even better 5% advance in 1984. This outlook should enable the industry to improve plant operating rates, push through some much-needed price increases, and write their financial reports in black, rather than red, ink.

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